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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/755,495	01/12/2004	Wei Hua Cheng	CS01-082B	1281

7590 09/12/2005

George O. Saile  
28 Davis Avenue  
Poughkeepsie, NY 12603

EXAMINER
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THOMAS, TONIAE M

ART UNIT	PAPER NUMBER
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2822

DATE MAILED: 09/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

H.A

**Office Action Summary**

Application No.

10/755,495

Applicant(s)

CHENG ET AL.

Examiner

Toniae M. Thomas

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 12 January 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 15-30 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 23-30 is/are rejected.
- 7) ☒ Claim(s) 16-22 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 January 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input checked="" type="checkbox"/> Interview Summary (PTO-413)          |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. <u>09062005</u> .                                    |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>19 Feb 2004</u> .   | 6) <input type="checkbox"/> Other: _____.                                   |

### **DETAILED ACTION**

1. This is a first Office action on the merits of Application Serial No. 10/132,337 filed 25 April 2002, now US 6,689,643.
2. The preliminary amendment filed on 12 January 2004 canceled claims 1-15. Accordingly, claims 16-30 are pending.

### ***Specification***

3. The disclosure is objected to because of the following informalities: "155" should be replaced with --153-- (page 7, line 2; page 7, line 9; page 7, line 17); "23" should be replaced with --53-- (page 7, line 8; page 7, line 16).

Appropriate correction is required.

### ***Drawings***

4. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the following must be shown or the features canceled from the claims: the formation of trenches 24 after the formation of tungsten via 35, as described in the specification at page 6, lines 1-4; permanent electrical connections on the top dielectric layer 53, as recited in claim 16, lines 21-22; and a metallic contact wire for each of the four tungsten vias, as recited in claim 23, line 21 (see specification - page 7, line 16- page 8, line 1). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application.

Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the examiner does not accept the changes, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Claim Objections***

5. Claims 16-30 are objected to because of the following informalities: "materia" should be replaced with --material-- (claim 16, line 13; claim 23, line 13). Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter that the applicant regards as his invention.

6. Claims 23-30 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The phrase "said filled via holes" lacks antecedent basis (claim 23, line 21).

***Allowable Subject Matter***

7. Claims 16-22 are objected to for minor informalities, as discussed above, but would be allowable upon correction of the minor informalities.

8. Claim 23 would be allowable if rewritten or amended to overcome the objection and the rejection under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action. Claims 24-30 would be allowable if rewritten to overcome the objection and the rejection under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

9. The prior art of record does not anticipate or render obvious an adjustable capacitor substantially as claimed. For example, the closest prior art of record, Dirnecker et al. (US 6,391,707 B1), discloses a method for forming a capacitor. The process comprises the steps of: providing a wafer; depositing a base dielectric layer (fig. 30); depositing an etch stop layer 506 on the base dielectric layer (fig. 30);<sup>1</sup> depositing a support dielectric layer 504, 512 on the etch stop layer (fig. 30); etching a via hole (fig. 30); depositing a barrier

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layer in the via hole, overfilling the via hole with tungsten, and planarizing so as to remove all the tungsten not inside the via hole (fig. 30 and col. 8, line 61 – col. 9, line 4);<sup>2</sup> etching three trenches 522 (fig. 31); depositing a first layer of metal 526, which forms a common electrode (figs. 32); depositing a dielectric layer 530 on the common electrode (fig. 33); depositing a second layer of metal 532 on the dielectric layer, and patterning to form four top electrodes (figs. 34, 36). However, the prior art of record does not anticipate, teach or suggest an adjustable capacitor substantially as claimed, wherein the capacitor comprises at least: four unconnected top electrodes, which are overlapped by the common electrode and have areas relative to one another in the ratio 5:2:1:1; a top dielectric layer on the top electrodes.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Toniae M. Thomas whose telephone number is (571) 272-1846. The examiner can normally be reached on Monday through Friday from 8:30 a.m. to 5:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on (571) 272-1852. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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<sup>1</sup> The base dielectric layer is the layer under the etch stop layer.

<sup>2</sup> The via in fig. 30 is identical to that which is described in fig. 16. Layer 314 is the barrier layer, and layer 316 is the tungsten plug.

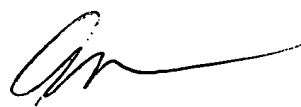
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TMT

06 September 2005



AMIR ZAFARANI  
PATENT EXAMINER  
TECHNICAL CENTER